In response to the Official Action dated June 25, 2002, Applicant requests reconsideration of the above-identified application pursuant to 37 U.S.C. § 1.116, in view of the following remarks.

REMARKS

Claims 25-67 are presented for reconsideration. Claims 25, 31, 36, 38, 40, 47, 52, 57, 59 and 61 are the only independent Claims.

The drawings have been objected to in that the feature recited in claims 32 and 33 of the plurality of optical elements each having a plurality of apertures must be shown in the drawing or canceled from the claim. This objection is respectfully traversed. It is submitted that at least Fig. 3 of the drawings clearly shows plural apertures 32 in each optical element 30 with the features of Claims 32 and 33. As shown in Fig. 3 and discussed at least from line 22 of page 14 to line 6 of page 15, A straight line connecting a peripheral aperture 32 of the upper optical element in Fig. 3 to any peripheral aperture 32 of the lower element rotated 90 degrees is clearly skewed with respect to the dashed optical axis line. The skewed straight line between apertures on adjacent optical elements could not possibly intersect the optical axes of the adjacent optical elements. It is believed that the features of Claims 32 and 33 are clearly shown in Fig. 3.

Claims 27-29 32-34, 36-46, 48-50, and 54-67 have been rejected under 35 U.S.C. § 112, first and second paragraphs in that it that the feature of "a plurality of optical components each having at least one aperture, wherein a straight line connecting apertures of adjacent optical elements is not parallel to any of optical axes of the adjacent optical elements". This objection is respectfully traversed.

Fig. 3 and the corresponding disclosure clearly supports optical components having plural apertures while Fig. 8 and the corresponding disclosure at lines 2-4 of page 22 support the recitation of optical components having a single aperture. That "apertures of adjacent optical elements are disposed at rotational positions, about an optical axis of said optical system, with angles other than zero degree and 180 degrees" is clearly shown by the positioning of the apertures 32 of adjacent optical elements are at rotational angles of 90 degrees. In view of the foregoing, it is believed that Claims 27-29 32-34, 36-46, 48-50, and 54-67 are fully supported by the drawings and the specification.

Claims 25 and 42 have been rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 3,624,819 to Crone. This rejection is respectfully traversed. Claims 26-30 have been rejected under 35 U.S.C. § 103 as being unpatentable over the Tanimoto et al. patent in view of either U.S. Patent No. 5,221,822 to Duny or U.S. Patent No. 5,227,605 to Boudot et al.

Pending independent Claim 25 is directed to an optical system that has an optical element with at least one aperture through which a gas can be transmitted.

In Applicant's view, Crone discloses a single lens reflex camera having a continuously observable view-finding feature. An apertured mirror is provided between the entrance aperture and shutter of the camera with the mirror positioned along the optical axis of the camera so that the film-exposing light passes therethrough and the remaining light passing into the camera is reflected onto the view-finder.

It is a feature of Claim 25 that the optical system with an optical element having at least one aperture though which gas can be transmitted is part of an exposure

apparatus that requires extraordinary high precision. In contrast, Crone only teaches a mirror with an aperture therethrough for passing film-exposure light and fails in any manner to teach or suggest the exposure apparatus of Claim 25. Accordingly, pending Claim 25 is believed to be completely distinguished from Crone and allowable.

Claims 31, 35, 43 and 36-67 have been rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 4,690,528 to Tanimoto et al. Claims 32-34 have been rejected under 35 U.S.C. § 103 as being unpatentable over the Tanimoto et al. patent in view of either U.S. Patent No. 5,221,822 to Duny or U.S. Patent No. 5,227,605 to Boudot et al.

Pending independent Claim 31 is directed to an exposure apparatus in which an optical system has at least one optical element and includes a support portion that supports the optical element. The supporting portion has plural apertures through which a gas can flow.

In Applicant's opinion, Tanimoto et al. discloses a projection exposure apparatus used to project a minute pattern formed on a photomask or reticle onto a semiconductive wafer that has a stabilized image-forming performance. In the apparatus, a projection lens system includes a plurality number of lens elements spaced apart from each other. A supply unit supplies a gas flow to at least one of spaces through which the gas passes and an isolating unit isolates the space(s) supplied with gas from atmosphere. A changing unit changes the refractive index of the isolated space(s).

It is a feature of Claim 31 that each supporting portion has plural apertures. Tanimoto et al. may teach gas flowing through spaces between lens elements but is devoid of any suggestion of a supporting portion for each optical element with plural apertures

therein. Accordingly, pending Claim 31 is believed to be completely distinguished from Tanimoto et al. and allowable.

Pending independent Claim 36 is directed to exposure apparatus in which an optical system has plural spaces separated by plural separating portions. Each space includes an optical element and a supporting portion that supports the optical element. Each of two adjacent separating portions of the plural separating portions has an aperture through which a gas can be transmitted and the apertures of the adjacent two separating portions are disposed at rotational positions about an optical axis of the optical system with angles other than zero degree and 180 degrees.

Pending independent Claim 57 is directed to an exposure apparatus in which a first separating portion separates a first space and a second space from each other. The first separating portion has a first aperture. A second separating portion separates the second space and a third space from each other. The second separating portion has a second aperture. A supply unit supplies gas to one of the first and third spaces. The relative rotational position of the first and second apertures about an optical axis of the exposure apparatus define an angle other than zero degrees and 180 degrees.

It is a feature of Claims 36 and 57 that the relative rotational position of the first and second apertures in the first and second separating portions, respectively, about an optical axis of the exposure apparatus define an angle other than zero degrees and 180 degrees. In contrast, Tanimoto et al. only teaches structures that have apertures disposed at positions shifted by 180 degrees about the optical axis. In at least this respect, it is believed that pending Claims 36 and 57 are completely distinguished from Tanimoto et al. and are allowable.

Pending independent Claim 38 is directed to an exposure apparatus having an optical system with plural spaces separated by plural separating portions. Each space includes an optical element and a supporting portion that supports the optical element. Each of two adjacent separating portions of the plural separating portions has an aperture through which a gas can be transmitted. A straight line connecting apertures of the adjacent two separating portions is not parallel to any of optical axes of optical elements of the adjacent two separating portions and the straight line also does not intersect any of the optical axes of the optical elements of the adjacent two separating portions.

It is a feature of pending Claim 38 that a straight line connecting apertures of the adjacent two separating portions is not parallel to any of optical axes of optical elements of the adjacent two separating portions and the straight line also does not intersect any of the optical axes of the optical elements of the adjacent two separating portions. In contrast, Tanimoto et al. only teaches apertures that are shifted by 180 degrees. Such 180 degree shift apertures are positioned so that a straight line is parallel to the optical axes of the optical elements and intersects the optical axis as clearly seen in Fig. 7 of Tanimoto et al.. It is therefore believed that pending Claim 38 is completely distinguished from Tanimoto et al. and is allowable.

Pending independent Claim 40 is directed to an exposure apparatus in which an optical system has plural spaces separated by plural separating portions. Each space includes an optical element and a supporting portion that supports the optical element. Each of two adjacent separating portions of the plural separating portions has an aperture through which a gas can be transmitted. A straight line connecting apertures of the

adjacent two separating portions is not contained in any of planes including optical axes of the optical elements of the adjacent two separating portions.

It is a feature of pending Claim 40 that a straight line connecting apertures of the adjacent two separating portions is not contained in any of planes including optical axes of the optical elements of the adjacent two separating portions. The arrangement of Tanimoto et al. having apertures of adjacent element shifted 180 degrees could not possibly suggest the feature of pending Claim 40. It is therefore believed that pending Claim 40 is completely distinguished from Tanimoto et al. and is allowable.

Pending independent Claim 59 is directed to an exposure apparatus in which an optical system directs light to an object to be exposed. A supply unit supplies a gas to one of first and third spaces. The optical system includes a first separating portion that separates the first space and a second space from each other. The first separating portion has a first aperture. A second separating portion separates the second space and the third space from each other. The second separating portion has a second aperture. A straight line connecting the first aperture and the second aperture is not parallel to an optical axis of the optical system and also does not intersect the optical system.

It is a feature of pending Claim 59 that a straight line connecting the first aperture and the second aperture is not parallel to an optical axis of the optical system and also does not intersect the optical system. This requirement of Claim 59 could not possibly be taught or suggested by Tanimoto et al. which is restricted to a 180 degree shift of apertures in first and second separating portions. As a result, it is believed that pending Claim 40 is completely distinguished from Tanimoto et al. and is allowable.

Pending Claim 61 is directed to an exposure apparatus in which an optical system directs light to an object to be exposed. A supply unit supplies a gas to one of a first space and a third space. The optical system includes a first separating portion that separates the first space and a second space from each other. The first separating portion has a first aperture. A second separating portion separates the second space and the third space from each other. The second separation portion has a second aperture. A straight line connecting the first aperture and the second aperture is not contained in any planes containing an optical axis of the optical system.

According to the invention of pending Claim 61, a straight line connecting the first aperture and the second aperture in first and second separating portions, respectively, is not contained in any planes containing an optical axis of the optical system. As discussed, Tanimoto et al. is limited to arrangement in which apertures of adjacent optical elements are shifted 180 degrees from each other. Accordingly, the straight line connecting apertures does not meet the condition that it is not contained in any planes containing the optical axis of its optical system. Accordingly, it is believed that pending Claim 61 is completely distinguished from Tanimoto et al. and is allowable.

Pending independent Claim 47 is directed to an exposure apparatus having an optical system that directs light to an object to be exposed. The optical system includes a transparent first optical element having at least one aperture. A supplying unit supplies gas to one of a space at a light entrance side of the first optical element and a space at a light exit side of the first optical element. The gas passes through the aperture.

It is a feature of pending Claim 47 that a gas is supplied to one of a space at a light entrance side of a first optical element having at least one aperture or to a space at the

light exit side of the first optical element. Tanimoto et al. may teach passing a gas through sidewalls of a barrel on which optical elements are supported but fails to suggest optical elements with apertures through which a gas passes through a light entrance or light exit side as in Claim 47. It is therefore believed that pending Claim 57 is completely distinguished from Tanimoto et al. and is allowable.

Pending independent Claim 52 is directed to an exposure apparatus in which an optical system directs light to an object to be exposed. The optical system has a first separation portion having apertures. The first separating portion separates a first space at a light entrance side of the first separating portion and a second space at a light exit side of the first separating portion from each other. A supplying unit supplies a gas to one of the first and second spaces and the gas passes through the apertures.

According to the invention of pending Claim 52 the separation portion has plural apertures and the separation portion separates first and second spaces from each other. In contrast, Tanimoto et al. requires that apertures are provided in a sidewall of a barrel supporting spaced optical elements rather than in separating portions that separate spaces as in Claim 52. As a result, it is believed that pending Claim 52 is completely distinguished from Tanimoto et al. and is allowable.

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

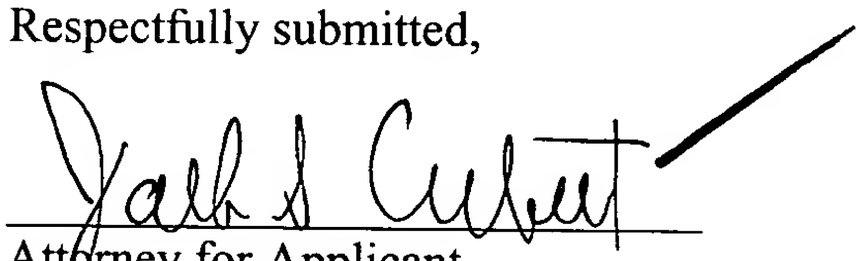
The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same

reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

In view of the foregoing remarks, Applicant respectfully requests favorable consideration and reconsideration and early passage to issue of the present application.

Applicants' attorney, Steven E. Warner, may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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